

CLAIMS

1 1. A method for generating an agent schedule for a multi-contact center,
2 wherein the multi-contact center processes a plurality of contact queues, comprising
3 immediate contact queues and deferred contact queues, the method comprising:
4 scheduling software receiving a plurality of scheduling data from a user
5 interface;
6 the scheduling software generating a plurality of scheduling constraints;
7 a search engine using the plurality of scheduling constraints to generate a
8 plurality of potential schedules comprising at least one potential schedule for each of
9 the plurality of contact queues, including first potential schedules for immediate
10 queues, and second potential schedules for deferred queues;
11 performing a first analysis on the first potential schedules to generate first
12 estimated service levels; and
13 performing a second analysis on the second potential schedules to generate
14 second estimated service levels, wherein the first estimated service levels and the
15 second estimated service levels are expressed in interchangeable units.

1 2. The method of claim 1, further comprising generating an agent
2 requirement score using the first estimated service levels, the second estimated service
3 levels, and at least one of the plurality of scheduling constraints.

1 3. The method of claim 2, further comprising:
2 the search engine using the agent requirement score to determine whether a
3 potential schedule is acceptable, wherein an acceptable potential schedule has a best
4 agent requirement score of the plurality of potential schedules; and
5 if the potential schedule is acceptable, outputting the potential schedule to the
6 user interface.

1 4. The method of claim 1, wherein the plurality of scheduling data
2 comprises:

3 at least one contact type, comprising telephone calls, email; fax, web chat,
4 voice over internet protocol, and call backs;
5 at least one forecast contact volume;
6 at least one forecast contact handling time;
7 at least one service goal;
8 at least one agent designation; and
9 at least one work rule.

1 5. The method of claim 1, wherein the plurality of scheduling constraints
2 comprises:

3 a service goal time for each interval in a multi-interval schedule period;
4 a workload for each interval in the multi-interval schedule period; and
5 a service goal percentage each interval in the multi-interval schedule period.

1 6. The method of claim 1, wherein immediate contacts include telephone
2 calls, and wherein deferred contacts include email, and fax.

1 7. The method of claim 1, wherein the interchangeable units are
2 percentage of workload complete, wherein workload is a total workload in a multi-
3 interval schedule period.

1 8. The method of claim 5, wherein the second analysis comprises
2 generating the second estimated service levels using a workload for each interval in a
3 multi-interval schedule period, and a capacity for each interval in the multi-interval
4 scheduling period.

1 9. The method of claim 8, wherein the workload is generated by
2 multiplying a forecast contact volume with a forecast average contact handling time.

1 10. The method of claim 9, wherein the capacity for an interval is
2 generated by multiplying a number of available agents with a number of seconds the
3 number of available agent work on a queue.

1 11. The method of claim 10, wherein at least one of the number of
2 available agents is capable of working on more than one queue, and wherein the
3 number of seconds worked on the queue is determined by static analysis.

1 12. The method of claim 10, wherein at least one of the number of
2 available agents is capable of working on more than one queue, and wherein the
3 number of seconds worked on the queue is determined by periodically simulating
4 contact arrivals.

1 13. The method of claim 10, wherein the second analysis further comprises
2 iterating over successive intervals in the multi-interval schedule period in
3 chronological order until a total capacity for the multi-interval schedule period is used
4 or a total workload for the multi-interval schedule period is completed, wherein
5 iterating comprises:

6 applying a capacity for a first interval to a workload of the first interval; and
7 if the workload of the first interval is not completed by the capacity for the
8 first interval, applying a capacity for a subsequent interval to the workload of the first
9 interval.

1 14. The method of claim 13, wherein the second analysis further comprises
2 evaluating a workload remaining after a total number of intervals in a service goal
3 time has elapsed.

1 15. A system for generating a schedule for a plurality of agents in a multi-
2 contact center, wherein the multi-contact center processes a plurality of contact
3 queues, comprising immediate contact queues and deferred contact queues, the system
4 comprising:

5 at least one server comprising at least one storage device;

6 at least one client processor coupled to the server through a network, wherein
7 the client processor is coupled to a plurality of storage devices, including a storage
8 device that stores instructions that, when executed, cause the at least one client
9 processor to,

10 receive a plurality of scheduling data from a user interface;

11 generate a plurality of scheduling constraints;

12 use the plurality of scheduling constraints to generate a plurality of potential
13 schedules comprising at least one potential schedule for each of the plurality of
14 contact queues, including first potential schedules for immediate queues, and second
15 potential schedules for deferred queues;

16 perform a first analysis on the first potential schedules to generate first
17 estimated service levels; and

18 perform a second analysis on the second potential schedules to generate
19 second estimated service levels, wherein the first estimated service levels and the
20 second estimated service levels are expressed in interchangeable units.

1 16. The system of claim 15, wherein the storage device that stores the
2 instructions is accessed by the at least one processor through the network.

1 17. The system of claim 15, wherein the storage device that stores the
2 instructions is the at least one storage device of the server.

1 18. The system of claim 15, wherein the stored instructions, when
2 executed, further cause the at least one client processor to generate an agent
3 requirement score using the first estimated service levels, the second estimated service
4 levels, and at least one of the plurality of scheduling constraints.

1 19. The system of claim 16, wherein the stored instructions, when
2 executed, further cause the at least one client processor to:

3 use the agent requirement score to determine whether a potential schedule is
4 acceptable, wherein an acceptable potential schedule has a best agent requirement
5 score of the plurality of potential schedules; and
6 if the potential schedule is acceptable, output the potential schedule to the user
7 interface.

1 20. The system of claim 15, wherein the plurality of scheduling data
2 comprises:

3 at least one contact type, comprising telephone calls, email; fax, web chat,
4 voice over internet protocol, and call backs;
5 at least one forecast contact volume;
6 at least one forecast contact handling time;
7 at least one service goal;
8 at least one agent designation; and
9 at least one work rule.

1 21. The system of claim 15, wherein the plurality of scheduling constraints
2 comprises:

3 a service goal time for each interval in a multi-interval schedule period;
4 a workload for each interval in the multi-interval schedule period; and
5 a service goal percentage each interval in the multi-interval schedule period.

1 22. The system of claim 15, wherein immediate contacts include telephone
2 calls, and wherein deferred contacts include email, and fax.

1 23. The system of claim 15, wherein the interchangeable units are
2 percentage of workload complete, wherein workload is a total workload in a multi-
3 interval schedule period.

1 24. The system of claim 19, wherein the second analysis comprises
2 generating the second estimated service levels using a workload for each interval in a
3 multi-interval schedule period, and a capacity for each interval in the multi-interval
4 scheduling period.

1 25. The system of claim 22, wherein the workload is generated by
2 multiplying a forecast contact volume with a forecast average contact handling time.

1 26. The system of claim 23, wherein the capacity for an interval is
2 generated by multiplying a number of available agents with a number of seconds the
3 number of available agent work on a queue.

1 27. The system of claim 24, wherein at least one of the number of
2 available agents is capable of working on more than one queue, and wherein the
3 number of seconds worked on the queue is determined by static analysis.

1 28. The system of claim 24, wherein at least one of the number of
2 available agents is capable of working on more than one queue, and wherein the
3 number of seconds worked on the queue is determined by periodically simulating
4 contact arrivals.

1 29. The system of claim 24, wherein the second analysis further comprises
2 iterating over successive intervals in the multi-interval schedule period in
3 chronological order until a total capacity for the multi-interval schedule period is used
4 or a total workload for the multi-interval schedule period is completed, wherein
5 iterating comprises:

6 applying a capacity for a first interval to a workload of the first interval; and
7 if the workload of the first interval is not completed by the capacity for the
8 first interval, applying a capacity for a subsequent interval to the workload of the first
9 interval.

1 30. The system of claim 17, wherein the second analysis further comprises
2 evaluating a workload remaining after a total number of intervals in a service goal
3 time has elapsed.

1 31. An electromagnetic medium containing executable instructions which,
2 when executed in a processing system, cause the system to generate a schedule for a
3 plurality of agents in a multi-contact center, wherein generating the schedule
4 comprises:

5 scheduling software receiving a plurality of scheduling data from a user
6 interface;

7 the scheduling software generating a plurality of scheduling constraints;

8 a search engine using the plurality of scheduling constraints to generate a
9 plurality of potential schedules comprising at least one potential schedule for each of
10 the plurality of contact queues, including first potential schedules for immediate
11 queues, and second potential schedules for deferred queues;

performing a first analysis on the first potential schedules to generate first estimated service levels; and

performing a second analysis on the second potential schedules to generate second estimated service levels, wherein the first estimated service levels and the second estimated service levels are expressed in interchangeable units.

32. The electromagnetic medium of claim 31, wherein generating the schedule further comprises generating an agent requirement score using the first estimated service levels, the second estimated service levels, and at least one of the plurality of scheduling constraints.

33. The electromagnetic medium of claim 32, wherein generating the schedule further comprises:

the search engine using the agent requirement score to determine whether a potential schedule is acceptable, wherein an acceptable potential schedule has a best agent requirement score of the plurality of potential schedules; and

if the potential schedule is acceptable, outputting the potential schedule to the user interface.

34. The electromagnetic medium of claim 31, wherein generating the schedule further comprises:

at least one contact type, comprising telephone calls, email; fax, web chat, voice over internet protocol, and call backs;

at least one forecast contact volume;

at least one forecast contact handling time;

at least one service goal;
at least one agent designation; and
at least one work rule.

35. The electromagnetic medium of claim 31, wherein generating the
schedule further comprises:

a service goal time for each interval in a multi-interval schedule period;
a workload for each interval in the multi-interval schedule period; and
a service goal percentage each interval in the multi-interval schedule period.

36. The electromagnetic medium of claim 31, wherein immediate contacts
include telephone calls, and wherein deferred contacts include email, and fax.

37. The electromagnetic medium of claim 31, wherein the interchangeable
units are percentage of workload complete, wherein workload is a total workload in a
multi-interval schedule period.

38. The electromagnetic medium of claim 35, wherein the second analysis
comprises generating the second estimated service levels using a workload for each
interval in a multi-interval schedule period, and a capacity for each interval in the
multi-interval scheduling period.

39. The electromagnetic medium of claim 38, wherein the workload is
generated by multiplying a forecast contact volume with a forecast average contact
handling time.

1 40. The electromagnetic medium of claim 39, wherein the capacity for an
2 interval is generated by multiplying a number of available agents with a number of
3 seconds the number of available agent work on a queue.

1 41. The electromagnetic medium of claim 40, wherein at least one of the
2 number of available agents is capable of working on more than one queue, and
3 wherein the number of seconds worked on the queue is determined by static analysis.

1 42. The electromagnetic medium of claim 40, wherein at least one of the
2 number of available agents is capable of working on more than one queue, and
3 wherein the number of seconds worked on the queue is determined by periodically
4 simulating contact arrivals.

1 43. The electromagnetic medium of claim 40, wherein the second analysis
2 further comprises iterating over successive intervals in the multi-interval schedule
3 period in chronological order until a total capacity for the multi-interval schedule
4 period is used or a total workload for the multi-interval schedule period is completed,
5 wherein iterating comprises:

6 applying a capacity for a first interval to a workload of the first interval; and
7 if the workload of the first interval is not completed by the capacity for the
8 first interval, applying a capacity for a subsequent interval to the workload of the first
9 interval.

1 44. The electromagnetic medium of claim 43, wherein the second analysis
2 further comprises evaluating a workload remaining after a total number of intervals in
3 a service goal time has elapsed.
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1 45. A method for generating an agent schedule for a multi-contact center,
2 wherein the multi-contact center processes a plurality of contact queues, comprising
3 immediate contact queues and deferred contact queues, the method comprising:

4 scheduling software receiving a plurality of scheduling data from a user
5 interface, wherein the scheduling data includes data regarding immediate contact
6 queues and deferred contact queues;

7 the scheduling software generating a plurality of scheduling constraints;

8 a search engine using the plurality of scheduling constraints to generate a
9 plurality of potential schedules comprising at least one potential schedule for each of
10 the plurality of contact queues;

11 performing an analysis on the at least one potential schedule to generate
12 estimated service levels in common units for both the immediate contact queues and
13 the deferred contact queues.

1 46. The method of claim 45, wherein the plurality of scheduling data
2 comprises:

3 at least one contact type, comprising telephone calls, email; fax, web chat,
4 voice over internet protocol, and call backs;

5 at least one forecast contact volume;

6 at least one forecast contact handling time;

at least one service goal;
at least one agent designation; and
at least one work rule.

47. The method of claim 45, wherein the plurality of scheduling constraints comprises:
a service goal time for each interval in a multi-interval schedule period;
a workload for each interval in the multi-interval schedule period; and
a service goal percentage each interval in the multi-interval schedule period.

48. The method of claim 47, wherein the analysis comprises generating the estimated service levels using a workload for each interval in a multi-interval schedule period, and a capacity for each interval in the multi-interval scheduling period.

49. The method of claim 45, wherein the common units are percentage of workload complete, wherein workload is a total workload in a multi-interval schedule period.

50. The method of claim 47, wherein the analysis comprises generating the estimated service levels using a workload for each interval in a multi-interval schedule period, and a capacity for each interval in the multi-interval scheduling period.

1 51. The method of claim 48, wherein the workload is generated by
2 multiplying a forecast contact volume with a forecast average contact handling time.

1 52. The method of claim 48, wherein the capacity for an interval is
2 generated by multiplying a number of available agents with a number of seconds the
3 number of available agent work on a queue.

1 53. The method of claim 52, wherein the analysis further comprises
2 iterating over successive intervals in the multi-interval schedule period in
3 chronological order until a total capacity for the multi-interval schedule period is used
4 or a total workload for the multi-interval schedule period is completed, wherein
5 iterating comprises:
6 applying a capacity for a first interval to a workload of the first interval; and
7 if the workload of the first interval is not completed by the capacity for the
8 first interval, applying a capacity for a subsequent interval to the workload of the first
9 interval.

1 54. The method of claim 53, wherein the analysis further comprises
2 evaluating a workload remaining after a total number of intervals in a service goal
3 time has elapsed.